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THE USE OF STANDARDIZED TESTS IN EVALUATING A METHOD OF TEACHING READING.

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SEX DIFFERENCES IN READING ACHIEVEMENT AND THE EFFECTIVENESS OF THE PHONOVISUAL METHOD OF READING INSTRUCTION IN GRADES 1 TO 3 WHEN USED AS A SUPPLEMENT TO THE STATE-ADOPTED CO-BASAL READING SERIES WERE STUDIED IN TWO ELEMENTARY SCHOOLS IN PASADENA, CALIFORNIA. SUBJECTS IN THE EXPERIMENTAL SCHOOL (60 IN GRADE 1, 68 IN GRADE 2, 54 IN GRADE 3) WERE MATCHED WITH CONTROL SCHOOL SUBJECTS ON THE BASIS OF CHRONOLOGICAL AGE, SEX, AND SCHOLASTIC APTITUDE AS MEASURED BY THE METROPOLITAN READINESS TESTS, CALIFORNIA SHORT-FORM TEST OF MENTAL MATURITY, AND THE LORGE-THORNDIKE INTELLIGENCE TESTS. EXPERIMENTAL SUBJECTS WERE GIVEN DAILY INSTRUCTION BY THE PHONOVISUAL METHOD 100 MINUTES PER WEEK WHILE CONTROL SUBJECTS WERE GIVEN AN EQUIVALENT AMOUNT OF INSTRUCTION WITH OTHER SUPPLEMENTARY MATERIALS. ACHIEVEMENT WAS TESTED BY THE CALIFORNIA READING TEST AND CALIFORNIA ACHIEVEMENT TESTS, READING AND SPELLING. MEAN TEST SCORES OF THE EXPERIMENTAL GROUP WERE FOUND TO BE SIGNIFICANTLY HIGHER AT THE .01 LEVEL OF ALL TESTS IN ALL GRADES EXCEPT SPELLING IN GRADE 3, WHICH WAS SIGNIFICANT AT THE .05 LEVEL. GIRLS' ACHIEVEMENT WAS FOUND TO BE HIGHER THAN BOYS' EXCEPT IN GRADE 3 OF THE EXPERIMENTAL GROUP. THE AUTHOR CONCLUDED THAT THE ADDITIONAL PHONICS INSTRUCTION WITH THE PHONOVISUAL METHOD INCREASED READING AND SPELLING ACHIEVEMENT. THIS PAPER WAS READ AT THE ANNUAL MEETING OF THE NATIONAL COUNCIL ON MEASUREMENT IN EDUCATION (NEW YORK, FEBRUARY 1967). (LS)

# THE USE OF STANDARDIZED TESTS IN EVALUATING A METHOD OF TEACHING READING[1]

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## INTRODUCTION

An interest in the use of additional structured phonics instruction in the teaching of reading prompted the principal and primary teachers at the Don Benito Elementary School in Pasadena, California, to request a pilot project with the Phonovisual Method (5) and materials to supplement the basic method of teaching reading in the Pasadena City Schools. The principal and primary grade teachers at Willard Elementary School agreed to have their primary grades serve as Control groups. After careful and considerable inservice training, the experimental study (4) was initiated in the spring of 1963.

## PROBLEM

The purpose of this research was to evaluate the effectiveness of the Phonovisual Method of reading instruction in kindergarten and grades 1-3 when used as a supplement to the State-adopted Co-Basal Reading Series and to observe any differences in reading achievement related to sex. The main questions to be answered were:

1. Will pupils achieve equally well in reading without the supplementary instruction in phonics?

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[1]Paper read at the 1967 annual meeting of the National Council on Measurement in Education, New York, N.Y., February, 1967.

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2. Will boys achieve as well in reading without the supplementary instruction in phonics?
3. Will girls achieve as well in reading without the supplementary instruction in phonics?

## METHOD

The design of the experiment called for Experimental and Control schools with comparable socio-economic characteristics and pupils of comparable age and abilities. Groups in grades one, two and three in the two schools were matched on scholastic aptitude, chronological age and sex. The scholastic aptitude measures used were: grade one - Metropolitan Readiness Tests; grade two - California Short-Form Test of Mental Maturity; grade three - Lorge-Thorndike Intelligence Tests. A boy in the Experimental school was matched with a boy of the same age, of the same mental ability and in the same grade in the Control school. Girls were similarly matched. Children were considered to be of the same age if within $\pm$ three months and as having "equal" learning readiness or scholastic ability if Total Readiness Scores or IQ's were identical or did not differ more than the Standard Error of Measurement of the test. The groups so selected consisted of 60 pairs in grade one, 30 boys and 30 girls; 68 pairs in grade two, 34 boys and 34 girls; and 54 pairs in grade three, 27 boys and 27 girls.[2]

The achievement tests used were: grade one - California Reading Test, Lower Primary; grade two - California Achievement Tests, Reading and Spelling, Upper Primary; grade three - California Achievement Tests, Reading and Spelling, Elementary.

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[2]Descriptive statistics of the matched groups will be found in An Evaluation of the Phonovisual Method, Grades 1-3, op. cit. (4)

Children in grades one, two and three of the Experimental school were given daily instruction by the Phonovisual Method, which amounted to 100 minutes per week. The most essential Phonovisual materials used were, (a) The Phonovisual Method, (b) The Phonovisual Diagnostic Consonant Charts, (c) The Phonovisual Diagnostic Vowel Charts, and (d) The Phonovisual Skill Builders. Children in the Control school also were given an equivalent amount of additional instruction in reading based upon organized material drawn from the following materials published by the Division of Instructional Service, Pasadena City Schools (3): (a) The APPENDIX of A Planned Sequence of Learnings in Phonics for Grades 1-3, (b) Supplementary materials listed in Guidelines for the Elementary Reading Program, (c) Reading and Literature section of Curriculum Guide for the Elementary Schools, and (d) Revised Reading Worksheets and Directions for Grades I, II, III.

In both Experimental and Control schools, the increased instruction was in addition to the scheduled reading instruction based upon the California Co-Basal Reading Series (1). Since the school day was not lengthened in either Control or Experimental school, the added time of 20 minutes per day was taken from other subjects: approximately five minutes daily from Opening Exercises, five minutes daily from Language Arts, and ten minutes daily from Social Studies. The ten minutes taken from Social Studies were replaced by social studies content in the regular reading periods.

Teachers in the Control school were told that their school was the Control school and that their classes were serving as Control classes. They had to be told, of course, about the additional time to be spent on reading and planned for the most profitable use of this time. They participated in the selection and organization of materials and had

additional inservice training. It is believed that all of these factors tended to maximize any possible Hawthorne Effect in the Control school and, consequently, any greater gain by pupils in the Experimental school is even more noteworthy.

## RESULTS

The performance of Experimental and Control groups on achievement tests is reported in Table 1.

The t-test was used to determine significance of differences between mean achievement of the groups (2). It was found that mean test scores of pupils in the Experimental groups exceeded the mean test scores of the pupils in the Control groups on all tests in all grades. As the data in Table 1 indicate, the differences were significant at the .01 level on all tests except Spelling in grade three. The hypothesis that pupils would achieve equally well in reading without the supplementary instruction in phonics had to be rejected. The results of statistical analyses of achievement test scores attained by Experimental and Control groups at each grade level - one, two and three - in Pasadena's Phonovisual pilot project support the conclusion that the Phonovisual materials and method of instruction have a salutary effect in the reading and spelling programs of the primary grades. All differences in mean performance between the two groups in each grade were in favor of the Experimental group and statistically significant.

In selecting the equivalent "grade level" samples with respect to scholastic ability and chronological age, equivalent groups of boys and equivalent groups of girls were drawn first. It was possible, therefore, to analyze the achievement test data of each sex. The performance of

Table 1

Comparison of Test Scores Achieved by Experimental and Control Groups in Grades 1, 2 and 3 on the California Achievement Tests

| | N | Mean Score | SD | SEm | Me-Mc | SEd | t | P |
|---|---|---|---|---|---|---|---|---|
| Grade 1 Lower Primary Test | | | | | | | | |
| Vocabulary | | | | | | | | |
| Experimental | 60 | 61.93 | 10.13 | 1.32 | 10.20 | 1.51 | 6.75 | .01 |
| Control | 60 | 51.73 | 11.57 | 1.51 | | | | |
| Comprehension | | | | | | | | |
| Experimental | 60 | 7.97 | 4.22 | .55 | 2.87 | .62 | 4.63 | .01 |
| Control | 60 | 5.10 | 3.92 | .51 | | | | |
| Grade 2 Upper Primary Test | | | | | | | | |
| Vocabulary | | | | | | | | |
| Experimental | 68 | 37.03 | 6.23 | .76 | 3.21 | 1.03 | 3.12 | .01 |
| Control | 68 | 33.82 | 6.39 | .78 | | | | |
| Comprehension | | | | | | | | |
| Experimental | 68 | 36.15 | 9.12 | 1.11 | 4.50 | 1.60 | 2.81 | .01 |
| Control | 68 | 31.65 | 10.15 | 1.24 | | | | |
| Spelling | | | | | | | | |
| Experimental | 68 | 13.81 | 4.69 | .57 | 2.03 | .71 | 2.86 | .01 |
| Control | 68 | 11.78 | 3.41 | .42 | | | | |
| Grade 3 Elementary Tests | | | | | | | | |
| Vocabulary | | | | | | | | |
| Experimental | 54 | 33.80 | 5.42 | .74 | 5.32 | 1.29 | 4.12 | .01 |
| Control | 54 | 28.48 | 8.13 | 1.12 | | | | |
| Comprehension | | | | | | | | |
| Experimental | 54 | 40.59 | 10.43 | 1.43 | 6.48 | 2.15 | 3.01 | .01 |
| Control | 54 | 34.11 | 11.51 | 1.58 | | | | |
| Spelling | | | | | | | | |
| Experimental | 54 | 15.09 | 5.14 | .71 | 2.15 | 1.03 | 2.09 | .05 |
| Control | 54 | 12.94 | 5.49 | .75 | | | | |

first and third grade boys and girls on achievement tests used in this study are summarized in Table 2. On the basis of mean test scores achieved by the respective groups in grade one, the hypothesis that boys would achieve as well in reading without the supplementary instruction in phonics and the hypothesis that girls would achieve as well in reading without the supplementary instruction in phonics had to be rejected.

The grade one mean test scores of boys in the Experimental group exceeded the mean test scores of boys in the Control group on the Vocabulary test and on the Comprehension test. The results were similar for the girls in both groups. All the differences in the first grade were significant at the .01 level.

In the third grade, it will be noted that the boys of the Experimental group achieved higher mean scores than did the boys in the Control group. The difference was significant at the .01 level on the Vocabulary test and at the .05 level on Comprehension and Spelling tests. The mean score made by the girls in the third grade Experimental group exceeded the mean score made by the girls in the Control group on the Vocabulary test. The difference was significant at the .05 level. The obtained difference of 4.86 raw score points between means on the Comprehension test favored the girls in the third grade Experimental group. This considerable difference in relation to the large standard error of the difference for the small subsamples fell between the .10 and the .05 level of significance.

## DISCUSSION

All the differences between mean scores indicate higher mean achievement test scores made by children in the Experimental school. An interesting comparison can be made with respect to the test performance of third grade boys and girls. Although the mean scores of the girls in

Table 2

Performance of First and Third Grade Boys and Girls in Experimental and Control Groups on the California Reading and Spelling Tests

| | N | Mean Score | SD | SEm | Me-Mc | SEd | t | P |
|---|---|---|---|---|---|---|---|---|
| **Grade 1** | | | | | | | | |
| Vocabulary | | | | | | | | |
| Boys - Experimental | 30 | 59.37 | 11.84 | 2.20 | | | | |
| | | | | | 8.80 | 2.24 | 3.93 | .01 |
| Boys - Control | 30 | 50.57 | 12.70 | 2.36 | | | | |
| Girls - Experimental | 30 | 64.50 | 7.12 | 1.32 | | | | |
| | | | | | 11.60 | 2.00 | 5.80 | .01 |
| Girls - Control | 30 | 52.90 | 10.14 | 1.89 | | | | |
| Comprehension | | | | | | | | |
| Boys - Experimental | 30 | 7.13 | 4.23 | .78 | | | | |
| | | | | | 2.56 | .86 | 2.98 | .01 |
| Boys - Control | 30 | 4.57 | 3.55 | .66 | | | | |
| Girls - Experimental | 30 | 8.80 | 4.05 | .75 | | | | |
| | | | | | 3.17 | .92 | 3.45 | .01 |
| Girls - Control | 30 | 5.63 | 4.20 | .78 | | | | |
| **Grade 3** | | | | | | | | |
| Vocabulary | | | | | | | | |
| Boys - Experimental | 27 | 34.89 | 5.59 | 1.10 | | | | |
| | | | | | 7.70 | 2.12 | 3.63 | .01 |
| Boys - Control | 27 | 27.19 | 8.45 | 1.66 | | | | |
| Girls - Experimental | 27 | 32.90 | 5.09 | 1.00 | | | | |
| | | | | | 3.12 | 1.39 | 2.24 | .05 |
| Girls - Control | 27 | 29.78 | 7.55 | 1.48 | | | | |
| Comprehension | | | | | | | | |
| Boys - Experimental | 27 | 41.00 | 11.81 | 2.32 | | | | |
| | | | | | 8.11 | 3.29 | 2.47 | .05 |
| Boys - Control | 27 | 32.89 | 11.68 | 2.29 | | | | |
| Girls - Experimental | 27 | 40.19 | 8.76 | 1.72 | | | | |
| | | | | | 4.86 | 2.81 | 1.73 | NS |
| Girls - Control | 27 | 35.33 | 11.20 | 2.20 | | | | |
| Spelling | | | | | | | | |
| Boys - Experimental | 27 | 14.22 | 5.31 | 1.04 | | | | |
| | | | | | 3.03 | 1.36 | 2.23 | .05 |
| Boys - Control | 27 | 11.19 | 3.62 | .71 | | | | |
| Girls - Experimental | 27 | 15.96 | 4.80 | .94 | | | | |
| | | | | | 1.26 | 1.48 | .85 | NS |
| Girls - Control | 27 | 14.70 | 6.38 | 1.25 | | | | |

the Control group exceeded the mean scores of the boys in the Control group - a familiar difference on reading achievement tests - the mean scores achieved in reading by boys in the third grade Experimental group not only exceeded the mean scores achieved by the boys in the third grade Control group, but also exceeded the mean scores achieved by the girls in the Experimental group.

## SUMMARY

The purpose of this research was to evaluate the effectiveness of the Phonovisual Method of reading instruction used to supplement the State-adopted Co-Basal Reading Series. Analyses of the achievement test results support the conclusion that the additional phonics instruction with the Phonovisual Method and materials increased reading and spelling achievement of the pupils who participated in this study.

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